14. map() function

Used to apply a function or a mapping (like a dictionary) to each element of a Series. It is generally used for element-wise transformations and substitutions.

> **Important**
>
> `map()` is applied only to Series objects, not DataFrames.
> It can take a function, a dictionary, or a Series as an argument.

Syntax:

```
Series.map(arg, na_action=None)
```

- `arg` : The function, dictionary, or Series to be applied.
- `na_acrion` : Indicates what to do with `N/A` values.
  If set to '`ignore`', it propagates N/A values without passing them to the mapping function.

Ex:

1. Applying a mathematical function to each element

```
import pandas as pd

s = pd.Series([1, 2, 3, 4, 5])

s_mapped = s.map(lambda x: x ** 2)
print(s_mapped)
```

```
0     1
1     4
2     9
3    16
4    25
dtype: int64
```

2. Mapping with a dictionary

```python
s = pd.Series(['cat', 'dog', 'rabbit'])

s_mapped_dict = s.map({'cat': 'kitten', 'dog': 'puppy'})

print(s_mapped_dict)
```

```
0    kitten
1     puppy
2       NaN
dtype: object
```

`apply()` vs. `map()`

	apply()	**map()**
Scope	Can be used with DataFrames and Series.	Used only with Series.
Functionality	apply functions along an axis of a DataFrame (row-wise or column-wise) or element-wise to a Series.	applies a function or a mapping to each element of a Series.
Use Case	when you need to apply a function to rows or columns of a DataFrame, or element-wise to a Series.	for simpler, element-wise transformations of a Series, such as substitutions or simple calculations.